GIBBS, H. L., P. MILLER, G. ALDERSON, AND S. G. SEALY. 1997. Genetic analysis of Brown-headed Cowbirds (*Molothrus ater*) raised by different hosts: data from mtDNA and microsatellite DNA markers. Molec. Ecol. 6:189–193.

GILL, S. A., P. M. GRIEF, L. M. STAIB, AND S. G. SEALY. 1997. Does nest defense deter or facilitate cowbird parasitism? A test of the nesting-cue hypothesis. Ethology 103:56–71.

HAUBER, M. E. 1998. Single-egg removal from an artificial nest by the Gray Catbird. Wilson Bull. 110: 426–429.

HAUBER, M. E. In press. Nest predation and cowbird parasitism in Song Sparrows. J. Field Ornithol.

LARISON, B., S. A. LAYMON, P. L. WILLIAMS, AND T. B. SMITH. 1998. Song Sparrows vs. cowbird brood parasites: impacts of forest structure and nest-site selection. Condor 100:93–101.

LOWTHER, P. E. 1979. Nest selection by Brown-headed Cowbirds. Wilson Bull. 91:118–122.

LOWTHER, P. E. 1993. Brown-headed Cowbird (*Molothrus ater*). *In* The birds of North America, no. 47 (A. Poole and F. Gill, Eds.). The Academy of Natural Scienees, Philadelphia, Pennsylvania; The American Ornithologists' Union, Washington, D.C.

MARTIN, T. E. 1993. Nest predation among vegetation layers and habitat types: revising the dogmas. Am. Nat. 141:897–913.

MCGEEN, D. S. AND J. J. MCGEEN. 1968. Cowbirds of Otter Lake. Wilson Bull. 80:84–93.

PATON, P. W. C. 1994. The effect of edge on avian nest success—how strong is the evidence? Conserv. Biol. 8:17–26.

PAYNE, R. B. 1977. The ecology of brood parasitism in birds. Annu. Rev. Ecol. Syst. 8:1–28.

ROMIG, G. P. AND R. D. CRAWFORD. 1995. Clay-colored Sparrows in North Dakota parasitized by Brown-headed Cowbirds. Prairie Nat. 27:193–203.

ROTHSTEIN, S. I. 1990. A model system for coevolution: avian brood parasitism. Annu. Rev. Ecol. Syst. 21:481–508.

SMITH, J. N. M. 1981. Cowbird parasitism, host fitness, and age of the host female in an island Song Sparrow population. Condor 83:152–161.

SMITH, J. N. M., P. ARCESE, AND I. MCLEAN. 1984. Age, experience, and enemy recognition by wild Song Sparrows. Behav. Ecol. Sociobiol. 14:101–106.

TEUSCHL, Y., B. TABORSKY, AND M. TABORSKY. 1998. How do cuckoos find their hosts? The role of habitat imprinting. Anim. Behav. 56:1425–1433.

THOMPSON, C. F. AND B. M. GOTTFRIED. 1981. Nest discovery and selection by Brown-headed Cowbirds. Condor 83:268–269.

U.S. NATIONAL INSTITUTES OF HEALTH. 1999. NIH Image 1.61. URL = http://rsb.info.nih.gov/nih-image/

UYEHARA, J. C. AND P. M. NARINS. 1995. Nest defense by Willow Flycatchers to brood-parasitic intruders. Condor 97:361–368.

VOGL, W., M. TABORSKY, B. TABORSKY, Y. TEUSCHL, M. HONZA, A. MOKSNES, AND E. ROSKAFT. 1997. How do female cuckoos (*Cuculus canorus*) find their hosts? Advan. Ethol. 32:162.

YAHNER, R. H. AND C. A. DELONG. 1992. Avian predation and parasitism on artificial nests and eggs in two fragmented landscapes. Wilson Bull. 194: 162–168.

Wilson Bull., 112(1), 2000, pp. 153–155

Male Dickcissels Feed Nestlings in East-central Illinois

J. Dylan Maddox[1,2] and Eric K. Bollinger[1,3]

ABSTRACT.—We observed male Dickeissels (*Spiza americana*) eommonly feeding nestlings in Conservation Reserve Program (CRP) fields in 1997 in east-central Illinois. Male Dickcissels fed nestlings at six of the eight nests we observed, accounting for 37% of the total nest visits. Overall, females made significantly more nest visits than males. However, at the six male-assisted nests, the number of malc and female nest visits did not differ significantly. Male Dickcissel feeding behavior may have been prompted by low food abundancc. Males were not observed feeding nestlings in 1998, when overall nest success was higher and nestling starvation was less than in 1997. *Received 29 March 1999, accepted 15 Sept. 1999.*

Nearly all male passerines feed their nestlings (Kendeigh 1952, Verner and Willson 1966, Silver et al. 1985). Among North American species, only males of the Dickcissel (*Spiza americana*) and the Boat-tailed Grackle (*Quiscalus major*) do not provide their nestlings with food (Verner and Willson 1969).

[1] Dept. of Biological Sciencs, Eastern Illinois Univ., Charleston, IL 61920.

[2] Present address: Dept. of Natural Resources and Environmental Sciences, Univ. of Illinois, Urbana, IL 61801.

[3] Corresponding author; E-mail: cfekb@eiu.edu

We found reports from only two nests at which male Dickcissels fed nestlings (Purdie 1878, Bellrose 1936). Purdie (1878) observed one male feeding nestlings in Massachusetts and Bellrose (1936) reported a rather ambiguous sighting of two Dickcissels feeding nestlings in northern Illinois during late August. No other study has documented significant male assistance in the Dickcissel (Gross 1921, Crabb 1923, Zimmerman 1966, Schartz and Zimmerman 1971, Fretwell 1977, Fink 1984). Nonetheless, we observed male Dickcissels commonly feeding nestlings at our study sites in east-central Illinois in 1997. The objective of our study was to determine the extent of this male assistance.

STUDY AREA AND METHODS

Our research was conducted from 26 June to 22 July 1997 in Conservation Reserve Program (CRP) fields of Coles and Cumberland counties, Illinois. We located all Dickcissel nests and checked them every 2–3 days to determine their fate. One to four 60 min observations were made at each Dickcissel nest containing nestlings with a 20× spotting scope from at least 50 m away. Each time an adult Dickcissel was observed visiting a nest, we recorded the sex of the individual and whether the individual was carrying food. Prior to most nest visits, adult Dickcissels would perch near the nest for a few seconds enabling us to determine if the individual was carrying food. In these cases, individuals were always seen carrying food to the nest. Males and females exhibited this behavior during 82% (61 of 74) and 56% (72 of 128) of the nest visits, respectively. In the absence of this perching behavior we frequently were unable to see individuals clearly enough to determine if they were carrying food. Given the strong evidence that food delivery nearly always accompanied nest visits, we included all nest visits in our analyses. Paired *t*-tests were used to compare the number of nest visits by males and females (Wilkinson 1997).

RESULTS

A total of 202 nest visits were observed at eight nests (Table 1). Male Dickcissels visited six of the eight nests (75%), accounting for 37% (74) of the total nest visits. At the six male-assisted nests, males made 42% of the feeding trips. Overall, females made significantly more nest visits (128) than males (74; $t = 2.6$, df = 7, $P < 0.05$). At male-assisted nests, males made as many nests visits as females did ($t = 1.8$, df = 5, $P > 0.05$). Prior to (and prompting) our data collection at these eight nests, at least two other males were observed feeding their nestlings.

TABLE 1. Number of female and male nest visits for each of eight Dickcissel nests in east-central Illinois.

Nest #	Number of nest visits		% Nest visits by male
	Female	Male	
1	19	19	50
2	19	9	32
3	8	8	50
4	24	21	47
5	10	10	50
6	23	7	23
7	18	0	0
8	7	0	0
Total	128	74	37
Male visited nests	103	74	42

DISCUSSION

These results represent the first reported occurrence of substantial male parental care in Dickcissels. Male Dickcissel assistance at the nest, though rare, may be an adaptive behavior that might emerge under specific environmental conditions. The advantages of male parental care are often significant (see Bart and Tornes 1989, Wolf et al. 1988, Dunn and Hannon 1989). However, males may be more inclined to provide (additional) parental care during unfavorable environmental conditions when a significant increase in fitness can be obtained (Emlen and Oring 1977, Oring 1982). Several failed nests in our study area were attributed to starvation, implying that 1997 was a difficult year in east-central Illinois for Dickcissels (E. K. Bollinger, unpubl. data) and other grassland birds (Davison 1998). We did not quantify food abundance in 1997. However, all eight Dickcissel nests found in the same fields in the following year (1998) successfully fledged at least one nestling, but not a single male Dickcissel was observed visiting a nest (E. K. Bollinger, unpubl. data). In 1997, 7 of 63 nestlings (11%, all nests combined) were found dead in the nest (probably as a result of starvation), whereas no nestlings were found dead in the nest in 1998 (26 nestlings). These data further support the view that male parental care in many birds may be phenotypically plastic, present during certain years (Emlen and Oring 1977, Oring 1982)

but relatively unimportant and often absent when food resources are more abundant (Dunn and Hannon 1992).

The occurrence of male parental care in Red-winged Blackbirds (*Agelaius phoeniceus*) is geographically variable (reviewed in Beletsky and Orians 1990). Males consistently provide their nestlings with food in some populations but not in others (Beletsky and Orians 1990). It is possible that parental care is geographically variable in Dickcissels and additional studies may reveal other populations with male assistance; however, this seems unlikely given that the Dickcissel has been studied throughout its breeding range. In addition, our population of Dickcissels exhibited male parental care one year (1997) but not the next (1998), further supporting the hypothesis that male Dickcissels fed nestlings in 1997 to offset limited food resources.

ACKNOWLEDGMENTS

We thank C. Bailey, C. English, B. Heinold, A. Kuncl, C. Newman, and especially B. Davison for their assistance in the field. J. Maddox, R. Wicdenmann, W. Jensen, and two anonymous reviewers provided constructive comments on the manuscript. This study was partially funded by grants from the TriBeta Research Foundation and the Undergraduate Research Council and Council for Faculty Research at Eastern Illinois University.

LITERATURE CITED

Bart, J. and A. Tornes. 1989. Importance of monogamous male birds in determining reproductive success. Behav. Ecol. Sociobiol. 24:109–116.

Beletsky, L. D. and G. H. Orians. 1990. Male parental care in a population of Red-winged Blackbirds, 1983–1988. Can. J. Zool. 68:606–609.

Bellrose, F. 1936. Late nesting records for northern Illinois. Auk 53:348.

Crabb, E. D. 1923. Notes on the nesting of a pair of Dickcissels (*Spiza americana*). Auk 40:606–609.

Davison, W. B. 1998. A comparison of predation rates on real and artificial nests of grassland birds. M.S. thesis, Eastern Illinois Univ., Charleston, Illinois.

Dunn, P. O. and S. J. Hannon. 1989. Evidence for obligate male parental care in Black-billed Magpies. Auk 106:635–644.

Dunn, P. O. and S. J. Hannon. 1992. Effects of food abundance and male parental care on reproductive success and monogamy in tree swallows. Auk 109:488–499.

Emlen, S. T. and L. W. Oring. 1977. Ecology, sexual selection, and the evolution of mating systems. Science 197:215–223.

Fink, E. J. 1984. Male Dickcissel behavior in primary and secondary habitats. Wilson Bull. 96:672–680.

Fretwell, S. 1977. Is the Dickcissel a threatened species? Am. Birds 31:923–932.

Gross, A. O. 1921. The Dickcissel (*Spiza americana*) of the Illinois prairies. Auk 38:1–26, 163–184.

Kendeigh, S. C. 1952. Parental care and its evolution in birds. Ill. Biol. Monogr. 22:1–356.

Oring, L. W. 1982. Avian mating systems. Avian Biol. 7:1–92.

Purdie, H. A. 1878. The Black-throated Bunting (*Euspiza americana*) nesting in Massachusetts. Bull. Nuttall Ornith. Club 3:45.

Schartz, R. L. and J. L. Zimmerman. 1971. Time and energy budget of the male Dickcissel. Condor 73: 65–76.

Silver, R., H. Andrews, and G. F. Ball. 1985. Parental care in an ecological perspective: a quantitative analysis of avian subfamilies. Am. Zool. 25: 823–840.

Verner, J. and M. F. Willson. 1966. The influence of habitats on mating systems of North American passerine birds. Ecology 47:143–147.

Verner, J. and M. F. Willson. 1969. Mating systems, sexual dimorphism, and the role of male North American passerine birds in the nesting cycle. Ornithol. Monogr. 9:1–76.

Wilkinson, L. 1997. SYSTAT 7.0: the system for statistics. SYSTAT Inc., Evanston, Illinois.

Wolf, L., E. D. Ketterson, and V. Nolan, Jr. 1988. Parental influence on growth and survival of Dark-eyed Junco young: do parental males benefit? Anim. Behav. 36:1601–1618.

Zimmerman, J. L. 1966. Polygyny in the Dickcissel. Auk 83:534–546.